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ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY

ENVIRONMENT, SAFETY, AND HEALTH SELF-ASSESSMENT REPORT FISCAL YEAR 2007

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I. Executive Summary

Lawrence Berkeley National Laboratory (LBNL) is composed of 17 separate divisions and directorates for Environment, Safety, and Health (ES&H) Self-Assessment. Through division self-assessments and Management of ES&H (MESH) reviews, all divisions demonstrated that they have sound and effective ES&H programs. Results of the new ESH Technical Assurance program indicate divisions are adequately implementing ES&H programs. However, all three assessment types identified room for improvement in institutional systems and division implementation of certain ES&H programs.

Findings from the Fall 2006 McCallum-Turner review of LBNL's Integrated Safety Management (ISM) program identified ways in which the Lab could improve implementation of ISM and made the following recommendations in the ISM Evaluation Report:

- Re-emphasize expectations for line accountability and responsibility for safety; strengthen implementing processes to reflect these principles
- Restructure and refine institutional ESH/Integrated Safety Management System (ISMS) documents
- Increase the rigor of the performance management process
- Fully implement an integrated Corrective Action Management System
- Strengthen the Laboratory self-assessment processes
- Increase the rigor and consistency of the work planning and control processes
- Ensure that the ISMS-related elements of LBNL-UC Berkeley (UCB) relationship are consistently articulated and clearly understood.

In response, LBNL developed the ISMS Evaluation Corrective Action Plan. The overall objective of the plan is to improve implementation of ISM in the key areas identified by the ISM Evaluation Report in order to sustain excellent safety performance while accomplishing the Laboratory's research and education mission. LBNL implemented numerous initiatives during the fiscal year 2007 (FY07) self-assessment year to foster these improvements.

Two significant improvement initiatives addressed the recommendation to strengthen LBNL's ES&H Self-Assessment processes. The first was to establish overall institutional ES&H performance objectives and align ES&H Self-Assessment with these objectives. The Division Self-Assessment performance criteria were designed to evaluate each division's performance in achieving these overall institutional ES&H objectives. In assessing performance against these criteria, divisions were encouraged to identify ways to improve current ES&H performance and not focus primarily on achieving institutionally established performance thresholds. This change resulted in more comprehensive self-assessments of divisions' ES&H programs. The second initiative was

to develop the ESH Technical Assurance program. This program is designed to evaluate institution-wide effectiveness of ES&H programs in a more detailed, focused, and explicit manner than the previously employed, division-focused Integrated Functional Appraisal.

The LBNL Safety Review Committee (SRC) performed MESH reviews of six divisions this fiscal year: Directorate/Operations, Engineering, Environment, Health and Safety (EH&S), Life Sciences Division (LSD), Nuclear Sciences Division (NSD) and Physics. The MESH reviews determined that management in all six divisions is strongly committed to safety and strives to effectively implement their divisions' ISM plan.

The Division Self-Assessments and MESH reviews identified opportunities for improvement that should be addressed institutionally. These are described in Section IV of this report and summarized in Appendix B, FY07 Self-Assessment Institutional Opportunities for Improvement. Division-specific deficiencies are tracked through resolution by each respective division.

Some divisions were subject to assessment under the Laboratory's new ESH Technical Assurance program. Subject areas for FY07 were the Chemical Hygiene and Safety Program, Controlled Substances, Cranes/Hoisting/Rigging, External Dosimetry, Pre-Placement Medical Evaluations, Radiological Work Area Posting, Satellite Accumulation Areas and the Wastewater Discharge Program. Section V of this report contains a summary of the ESH Technical Assurance program assessments and findings.

II. Introduction

LBNL's ES&H Self-Assessment Program ensures that ISM is implemented institutionally and by all divisions. The Self-Assessment Program, managed by the Office of Contract Assurance (OCA), provides for an internal evaluation of all ES&H programs and systems at LBNL. The functions of the program are to ensure that work is conducted safely, and with minimal negative impact to workers, the public, and the environment. The Self-Assessment Program is also the mechanism used to institute continuous improvements to the Laboratory's ES&H programs. The program is described in LBNL/PUB 5344, *Environment, Safety and Health Self-Assessment Program* and is composed of four distinct assessments: the Division Self-Assessment, MESH review, ESH Technical Assurance, and the UC/DOE Contract 31 Appendix B Self-Assessment.

The Division Self-Assessment uses the five core functions and seven guiding principles of ISM as the basis of evaluation. Metrics are created to measure performance in fulfilling ISM core functions and guiding principles as well as promoting compliance with applicable regulations.

The five core functions of ISM are as follows:

1. Define the scope of work
2. Identify and analyze hazards
3. Control the hazards
4. Perform the work
5. Feedback and improvement

The seven guiding principles of ISM are as follows:

1. Line management responsibility for ES&H
2. Clear roles and responsibilities
3. Competence commensurate with responsibilities
4. Balanced priorities
5. Identification of EH&S standards and requirements
6. Hazard controls tailored to the work performed
7. Operations authorization.

Performance indicators are developed by consensus with OCA, division representatives, and EH&S Division program managers. Line management of each division performs the Division Self-Assessment annually. The primary focus of the review is workplace safety.

The MESH review is an evaluation of division management of ES&H in its research and operations, focusing on implementation and effectiveness of the division's ISM plan. It is a peer review performed by members of the LBNL SRC, with staff support from OCA. The SRC includes representatives of each science and operations division at LBNL. Each division receives a MESH review every two to four years, depending on the results of the previous review.

The ESH Technical Assurance Program provides the framework for systematic reviews of ES&H programs and processes. The intent of ESH Technical Assurance assessments is to provide assurance that ES&H programs and processes comply with their guiding regulations, are effective and are properly implemented by Laboratory divisions.

The Contract 31 Performance Evaluation and Measurement Plan (PEMP) requires that the Laboratory sustain and enhance the effectiveness of integrated safety, health, and environmental protection through a strong and well-deployed system. The annual Contract 31 report is submitted to DOE at the close of the fiscal year. This assessment is the DOE's primary mechanism for evaluating the Laboratory's contract performance in ISM.

Throughout the following discussion, the following abbreviations are used for certain LBNL divisions: AFRD (Accelerator and Fusion Research Division), ALS (Advanced Light Source), CSD (Chemical Sciences Division), EETD (Environmental Energy Technologies Division), EH&S (Environment, Health, and Safety Division), ESD (Earth Sciences Division), IT (Information Technology Division), LSD (Life Sciences Division), MSD (Materials Sciences Division), NSD (Nuclear Science Division), and PBD (Physical Biosciences Division).

III. ES&H Improvements

Status of Fiscal Year 2006 (FY06) Self-Assessment Corrective Actions

Each year, as a result of the annual ES&H self-assessment process, the Laboratory identifies institutional issues that require management action. The status of the corrective actions for the institutional issues identified in the FY06 ES&H Self-Assessment Report are described below.

1. Communication of the UC/LBNL Partnership Agreement

The Laboratory continued its efforts to address the communication gap by conducting a series of meetings between UCB EH&S, LBNL EH&S and LBNL divisions that have a significant presence at UCB, including MSD, CSD, PBD, LSD and Physics. The objectives of these meetings were to familiarize the parties with the provisions of the Partnership Agreement and to work out how these provisions should be implemented.

LBNL and UCB also met under the auspices of the Joint UCB/LBNL Research Issues Steering Committee co-chaired by Vice Chancellor Beth Burnside and LBNL Deputy Director Graham Fleming. Discussion topics included billing for Radiation Use Authorizations (RUAs) for LBNL researchers on campus and the impact of the McCallum-Turner review. Numerous meetings and conference calls were also held between UCB and LBNL regarding Calvin Laboratory and establishment of the Energy Biosciences Institute (EBI). Many of these meetings included participation by research divisions with staff on campus.

These efforts resulted in agreements to coordinate laboratory inspections, share inspection findings and implement methods to manage ES&H corrective actions; development of a UCB ISM plan; an orderly transfer of ES&H responsibilities for Calvin Laboratory to campus; safe renovation of space in Calvin; establishment of a health and safety plan for EBI, agreement on RUA reimbursement; equivalency of laser safety training; and overall improved communication and coordination between UCB and LBNL.

2. Hazard Identification and Analysis

The lack of a systematic methodology for identifying and inventorying hazards (and hazardous equipment) was cited in the FY05 and FY06 assessments, which prompted the Laboratory's Industrial Hygiene (IH) Group to develop an integrated EH&S data management system. These efforts began in FY05, and over the course of two fiscal years, the Hazard Equipment and Authorization Review (HEAR) integration project worked to eliminate the redundant data-keeping issues of its predecessor, improve user interface to promote usability, and add additional data systems in an effort to create a fully integrated inventory of hazards that is accessible and useful to the Laboratory community. The product of this project is the Hazard Management System (HMS). This system serves as a hub for EH&S databases that queries eleven hazard, equipment, and

authorization systems to produce a comprehensive EH&S summary report. The system also houses hazard and equipment data that lack its own source system and gives users the opportunity to manage these items, their associated people and projects, as well as safety review and maintenance events. The system standardizes the nature and format for which hazards can be institutionally identified, inventoried, and reported.

3. Satellite Accumulation Area (SAA) Compliance

Divisions, supported by the LBNL Waste Management Group, worked to improve SAA compliance in FY07 and, through their self-assessment activities, some divisions noted fully compliant SAAs. During this period, the City of Berkeley inspected SAAs in randomly chosen buildings and identified no violations. However, some divisions' self-assessments determined their SAA performance was unsatisfactory, ESH Technical Assurance assessments of 89 SAAs conducted by the Waste Management Group found only 26% of those SAAs in full compliance with Lab policy, and all five Nonconformance and Corrective Action Reports (NCAR) issued by the Waste Management Group during the fiscal year were for waste stored in SAAs over the Laboratory's allowable time limit. To mitigate the potential for SAA storage time violations, some divisions are enforcing more restrictive administrative deadlines on waste removal. Additional efforts are needed in this area.

4. Authorization Compliance

The Industrial Hygiene Group created a Web-based Activity Hazard Document (AHD) management system to replace the antiquated paper system that had been used for the previous ten years. An implementation plan was developed and managed throughout FY07, which resulted in the migration of approximately 100 existing AHDs to the new system. The electronic system facilitates improved document preparation and review processes, and provides a central repository for the documents. As part of this process, Principal Investigators (PIs), Division Safety Coordinators, EH&S Division Liaisons, and subject matter experts performed comprehensive reviews of activity hazards, evaluated the adequacy of controls, and made recommendations for improvement. The resulting information was documented in the AHDs at the time of migration. Moving forward, the AHD program manager plans to develop an ESH Technical Assurance Assessment Plan to monitor performance and to promote continuous improvement.

To address an increase in radiological work noncompliances, the Radiological Work Permit (RWP) staff manager worked closely with work leaders, primarily from the Facilities Division, to better communicate program expectations, pre-job training and worker responsibilities. This effort has contributed to a decrease in noncompliances in the RWP program. Additionally, compliance with the required X-ray system interlock checks improved in FY07 due to an enhanced automated reminder system for both the customer and Radiation Protection Group staff. An ESH Technical Assurance Assessment Plan addressing the elements of 10CFR835 was developed to assess each subject area quarterly. The General Employee Radiation Training (GERT) requirement for contractors was added to subcontract agreements in an effort to provide this

information and training links to all subcontractors prior to their arrival at LBNL. Furthermore, the Laboratory is working to redesign the proximity key access software system to allow a direct link to the EH&S training database to confirm GERT qualification prior to allowing access to controlled areas.

5. Facilities Costs

The Facilities Division recognizes the problems with effectively providing estimates on projects. The causes vary from the lack of a consistent process to the unstable Bay Area construction environment, where prices have been fluctuating widely. To improve these problems, and others affecting service delivery, Facilities implemented a divisionwide reorganization in November 2007. The reorganization aligned Facilities into a project-focused organization that will clearly define the project process from inception through planning, estimating, construction and completion. One of the key elements of this new strategy is the re-engineering of our estimating process, placing more controls on estimates produced and closer oversight of their quality. Improvements in this area continue and will be further monitored.

6. Timely Corrective Action Implementation

Divisions made steady improvements in resolving overdue ES&H deficiencies. At the beginning of the fiscal year, there were 324 overdue ES&H Corrective Action Tracking System (CATS) entries, and by fiscal year-end this was reduced to a more manageable 73. Beginning in FY08, the CATS database allows users to set appropriate deadlines rather than the default deadlines based on selected risk level. Performance in relation to these deadlines is monitored by divisions and OCA. The FY07 Division Self-Assessments were more effective than in prior years in addressing opportunities for improvement identified in FY06.

IV. Division ES&H Self-Assessments & Safety Review Committee Management of Environment, Safety and Health Reviews

This section describes the results of both Division ES&H Self-Assessment and Safety Review Committee (SRC) Management of Environment, Safety and Health (MESH) reviews. Best practices identified from these assessments are detailed in Appendix A, FY07 Self-Assessment Divisional Noteworthy Practices. The Division Self-Assessment process and MESH reviews noted institutional opportunities for improvement that are listed in this section and described in further detail in Appendix B, FY07 Self-Assessment Institutional Opportunities for Improvement. Institutional opportunities for improvement are identified in individual assessment reports and also by collectively considering and trending assessment results. Divisions follow through resolution division-specific deficiencies identified from these reviews.

Division Self-Assessments

Divisions use the current Self-Assessment Program performance criteria to evaluate their work activities, workplaces, and operations for conformance to safe practices and environmental stewardship. Self-assessment activities include ongoing inspections, informal walkthroughs, hazard reviews, interviews with managers and staff, and review of ES&H performance indicators. At the end of the performance year, each division prepares a report that summarizes these activities and appraises their ES&H performance. OCA reviews these reports and validates the assessment with division representatives and DOE observers. The validation is performed to provide feedback on the comprehensiveness of the divisions' self-assessment processes and to identify opportunities for improvement and noteworthy practices in these processes.

FY07 was a transition year from the previously employed, criteria-focused model of assessment to a more comprehensive approach. The Laboratory also made the transition from a performance year spanning from July 1–June 30 to the fiscal year October 1–September 30.

MESH Reviews

The SRC conducts reviews of each division's management of environment, safety, and health in operations and/or research, focusing on the implementation and effectiveness of each division's ISM Plan. For fiscal year 2007 (FY07), the SRC conducted MESH reviews in the following divisions:

Division	MESH Review Date
Physics	December 2006
Directorate/Operations	October 2007 (in progress)
Engineering	July 2007
Environment, Health and Safety	July 2007
Life Sciences	August 2007
Nuclear Sciences	July 2007

Performance Results

ISM Core Function 1: Define Work

Divisions describe their processes for sustaining the five core functions of ISM in division-specific ISM plans. A performance expectation for this fiscal year was to revise division ISM plans to reflect ES&H policy changes and updates to the institutional ISM plan. Divisions updated their ISM plans to reflect significant PUB-3000 *Health and Safety Manual* revisions; however, the institutional ISM plan was not updated in time for divisions to consider this fiscal year. Divisions communicated the content of their plans via all-hands meetings, group meetings, division Websites and other means. One division even developed division-specific online-required ISM training and designed ISM badges for employees to carry and serve as a constant reference and reminder of ISM.

Divisions continue to enhance ES&H communications. In addition to the well-established role of Division Safety Coordinators and Division Safety Committees, some divisions have created subcommittees and working groups focusing on ergonomics, safety culture, incident investigation, and other areas of interest. Division Directors and/or Deputy Division Directors participate in some divisions' safety committees and divisions commonly include safety as a standing agenda item at senior division leadership meetings. Some divisions have allocated resources for deputy safety coordinators, ES&H technicians and ES&H administrators. The self-assessments identified the need for additional resources devoted to the DSC function in one division and the lack of a meaningful charge for the division safety committee in another.

Ensuring line management accountability for safety is a high priority across divisions. This is especially challenging for those divisions with a large population working on the UCB campus, a significant number of guests, and, in the case of Genomics Division, a portion of staff covered by another division's ISM plan. Divisions have taken proactive measures to ensure that line managers are aware of their responsibilities and provide them with tools to assist them in fulfilling their safety duties. Safety program aids include guidelines, instructions on use of ES&H databases,

checklists, regular reports on safety statistics, etc. Some divisions have instituted processes by which line managers attest to their commitment to performing required ES&H functions. Examples include Supervisor Safety Plans describing supervisors' commitment to assessing workspace safety and annual Safety Assurance Statements reviewed and signed by supervisors.

Institutional Opportunities for Improvement

- Current processes for notifying affected personnel of substantive revisions to PUB-3000 are inadequate.
- Existing policy[1] on roles and responsibilities for matrixed staff does not adequately address responsibilities and authorities for space and equipment use.
- The selection, qualifications, training, and responsibilities of Shop Managers need to be more clearly defined, communicated, and implemented.

Refer to Appendix B, FY07 Self-Assessment Opportunities for Institutional Improvement, for a complete list, associated recommendations, and status.

ISM Core Function 2: Identify and Analyze Hazards

Divisions identify and analyze hazards by reviewing work activities and inspecting workspaces and operations. During the performance period, the Laboratory instituted a policy requiring divisions to develop and implement a safety walkaround program. EH&S continues to work with divisions to customize EHS0027 (Performing an Effective Safety Walkaround) in order to maximize the effectiveness of this activity. All divisions initiated a safety walkaround program, although some have yet to fully implement it as described in their ISM plans. In addition to walkarounds, divisions conduct formal self-assessment inspections that may include the Division Safety Coordinator, EH&S Liaison and EH&S subject matter experts. Divisions with work on the UCB campus maintain awareness of safety conditions by inspecting these workspaces, gathering UCB inspection records, or both.

Divisions perform project safety reviews to identify and analyze hazards. Examples include Physics' and NSD's Project Safety Questionnaire, ALS's Experiment Safety Sheet, MSD's Project Hazard Guide Questionnaire, and ESD's Safety Review Questionnaire. To identify and control hazards encountered in off-site work, ESD uses an Off-Site Safety and Environmental Protection Plan and EETD completes its Off-Site Safety Review form. The self-assessments noted the need for greater formality in some of these processes and in hazard identification and review in other divisions. Divisions' fulfillment of plans for improvement and Laboratory-wide implementation of the Job Hazards Analysis process will enhance hazard identification and analysis.

Most divisions documented their hazards and environmental impacts inherent in their work in the institutional Hazard, Equipment, and Authorization Review (HEAR) database. As described in Section III EH&S Improvements, the Industrial Hygiene Group

[1] LBNL/PUB-3000 Health and Safety Manual, Chapter 1, Section 1.3.2.7 Matrixed Employees

developed a replacement database to HEAR, the Hazard Management System (HMS). This system serves as a hub for EH&S databases, which queries eleven hazard, equipment, and authorization systems to produce a comprehensive EH&S summary report. FY2008 will serve as a transition year from the HEAR database to HMS.

Lab staff demonstrated awareness of the environmental impacts of their activities and sought ways to reduce those impacts. Divisions conducted environmental performance reviews for selected new and existing work, and some completed an Environmental Review and Self-Assessment Checklist to guide their assessment activities in this area. All divisions addressed efforts at reducing paper use, recycling commonly used items, and purchasing Energy Star and recycled content products (RCPs). Successes include hazardous waste stream minimization, energy conservation and increased procurement of RCPs. Overall, the Lab increased procurements of RCPs by 53% compared to baseline year FY2005. Appendix A FY07 Self-Assessment Divisional Noteworthy Practices includes highlights of divisions' pollution prevention, energy conservation, recycling and waste-minimization efforts.

Institutional Opportunities for Improvement

- Not all divisions have fully implemented an effective safety walkaround program.
- Hazard identification and analysis, including that for off-site work, needs improvement in some areas.
- Use of the Laboratory's HMS to inventory hazards is not an institutional requirement.
- The Chemical Management System has no method for a custodian to certify a non-changing inventory as accurate. Enhanced notification and reporting capabilities are also areas for improvement.
- Inadequate or outdated emergency evacuation signs are posted at some Laboratory locations.

Refer to Appendix B, FY07 Self-Assessment Opportunities for Institutional Improvement, for a complete list, associated recommendations, and status.

ISM Core Function 3: Control Hazards

Divisions administratively control work through formal and self-authorizations. One type of formal authorization, the Activity Hazard Document (AHD), underwent improvement in FY07. As described in Section III, ES&H Improvements, the Industrial Hygiene Group created a Web-based AHD management system to replace the antiquated paper system that had been used for the previous ten years. The electronic system facilitates improved document preparation and review processes, and provides a central repository for the documents. At the end of FY07, approximately 94% of AHDs had been migrated into the new systems. The remainder will be migrated in early FY08.

Identifying and mitigating ergonomic hazards continued to be a high priority across the Laboratory. Divisions demonstrated their commitment to addressing ergonomic hazards by allocating resources for ergonomic equipment and supporting the ergonomics advocate program. Improvements extended beyond the office environment to laboratory spaces and shop areas. Some divisions have developed ergonomics policies and programs, and others are considering this as an FY08 improvement opportunity. Notable among the Lab's achievements was development of an innovative "Shake 'N Plate" instrument, a device designed to alleviate upper-body fatigue associated with bacterial culture plating. In March 2007, the Lab's Genomics Division accepted the prestigious 2007 Ergo Cup for this technology. Divisional FY08 goals include improved early intervention efforts and further broadening of evaluation to non-office areas such as the 88-Inch Cyclotron control room, ALS beamline user end stations, and certain Facilities functions.

Institutional Opportunity for Improvement

- Implementation of the Laboratory's Ergonomics Program needs improvement in some areas; equipment loaner program, database information, and ergonomic equipment procurements.

Refer to Appendix B, FY07 Self-Assessment Opportunities for Institutional Improvement, for a complete list, associated recommendations, and status.

ISM Core Function 4: Perform Work

Divisions assessed their activities to determine if work was performed within ES&H conditions and requirements specified by Laboratory policies and procedures. Aspects assessed include formal work authorization and hazardous work permit compliance, environmental compliance including waste management, required training completion, and accident and injury data.

Authorization compliance under the Laboratory's Radiation Protection Plan, in particular the Radioactive Work Permit (RWP) program, improved considerably over performance year 2006. During FY07, the RWP staff manager worked closely with work leaders, primarily from the Facilities Division, to better communicate program expectations, pre-job training and worker responsibilities. Facilities received no RWP violations in FY07. Additionally, compliance with the required X-ray system interlock checks improved in FY07, due to an enhanced automated reminder system for both the customer and Radiation Protection Group (RPG) staff. In total, RPG issued six Level 2 (major) violations in FY07 as compared to 14 Level 2 violations in performance year 2006. RPG issued no Level 3 (safety-significant) violations in FY07, whereas it issued two in performance year 2006.

FY07 was a transition year from the divisional-focused Integrated Functional Appraisal method of assessing authorization compliance to the program-based ESH Technical Assurance assessments. Expansion of ESH Technical Assurance in FY08 will provide divisions with additional feedback on authorization and hazardous work permit

compliance. Furthermore, data available in the new Web-based AHD system should enable divisions to more effectively assess authorization compliance.

Berkeley Lab had four environmental incidents during FY07. All were minor regulatory violations resulting from a sewer system overflow, a medical waste inspection by the Department Health Services (DHS), and two hazardous waste inspections conducted by the State of California Department of Toxic Substances Control (DTSC). Facilities Division promptly addressed the sewer system overflow and scheduled regular maintenance to prevent recurrence. Divisions took corrective action to address findings of the medical waste inspection and the Waste Management Group will implement the ESH Technical Assurance program for medical waste in FY08. Actions taken by the DTSC included a Consent Order fining the Laboratory for several violations of the hazardous waste regulations from inspections in 2003, 2004, and 2005. The violations included three items stored in Satellite Accumulation Areas (SAAs) in excess of one year and one instance of transporting hazardous waste from LBNL to B903 in a salvage hopper. LBNL also received the final report of the May 2006 DTSC inspection of the Hazardous Waste Handling Facility, citing two minor labeling violations that were corrected at the time of the inspection.

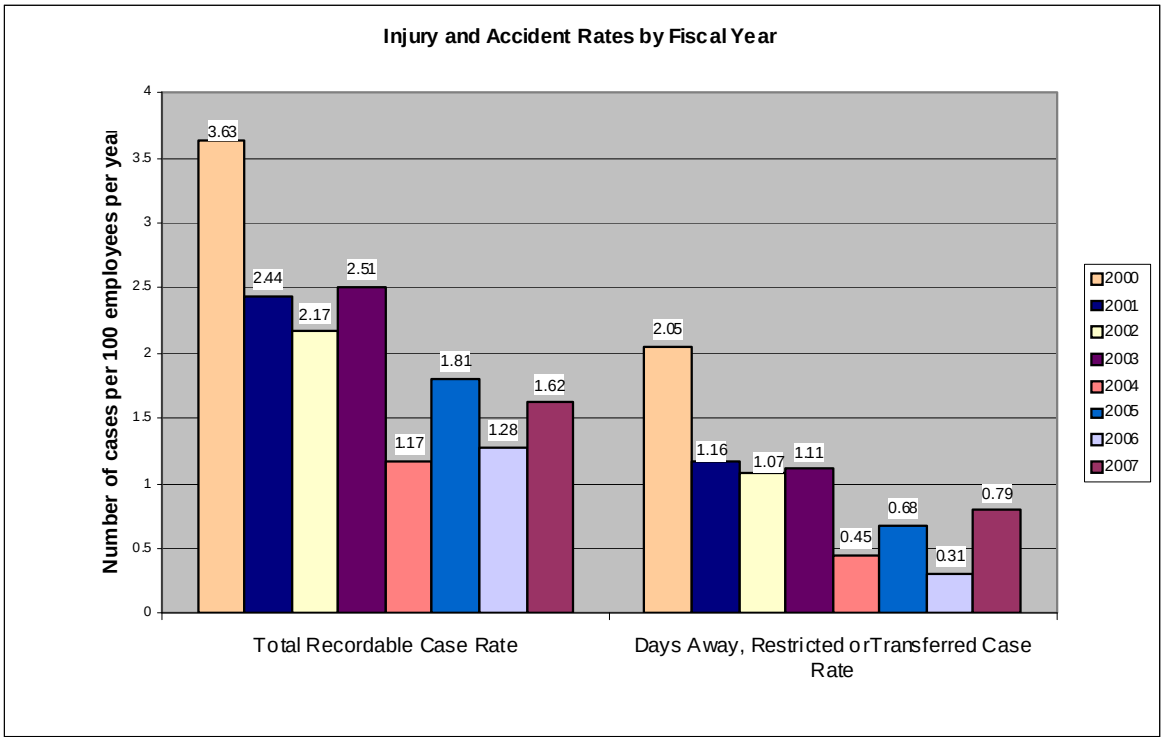
Through their self-assessments, some divisions noted fully compliant SAAs, while others determined their performance was unsatisfactory. ESH Technical Assurance assessments of 89 SAAs conducted by the Waste Management Group found only 26% of those SAAs in full compliance with Laboratory policy. Furthermore, all five Nonconformance and Corrective Action Reports (NCAR) issued by the Waste Management Group during the fiscal year were for waste stored in SAAs over the Laboratory's allowable time limit. To mitigate the potential for SAA storage time violations, some divisions are enforcing more restrictive administrative deadlines on waste removal. The Laboratory's average Quality Assurance waste sampling compliance was 97.8% in FY07, an improvement over the performance year 2006 score of 88.1%.

Overall, the Laboratory achieved a 92% ES&H training completion rate. Four divisions reported Job Hazards Questionnaire (JHQ) completion rates below 90%. To heighten awareness of JHQ and training completion rates, most divisions regularly report JHQ and training completion statistics to their division safety committees and management. Some divisions have taken unique approaches to improve performance in this area, such as posting overdue JHQ and training reports in the division directorate lobby, requiring employees and their supervisors to meet with the division director to justify overdue training, and revoking card key access for personnel with lapsed training. To improve divisions' ability to ensure appropriate training, EH&S updated the JHQ interface to differentiate between EH&S training drivers for LBNL staff working on the main site and on campus. Division-specific ES&H introductory training and orientation is becoming more common, which enables divisions to focus on pertinent issues, provides an opportunity for new employees to meet the DSC, and encourages safety discussions among division employees.

Divisions have fully integrated students into their ES&H programs, and most report that they consider them no differently from employees with regards to implementing

ISM. Some divisions with a large annual influx of summer students conduct more frequent orientation sessions to ensure that all students receive the proper training.

Injury and accident rates were not evaluated at the divisional level during FY07. Positive achievements in this area include completion of two years of almost injury-free construction work. This included more than 335,000 work hours with only one recordable injury. This significant accomplishment is far better than the national average. In addition, four divisions had no recordable injuries during the year. The FY07 Laboratory-wide Total Recordable Cases (TRC) rate is 1.62, an increase over the FY06 TRC rate of 1.28. In response to rising illness and injury case rates, the Laboratory formulated an aggressive program to reduce the number and severity of injuries, specifically ergonomics injuries, which represented approximately 67% of injuries in FY07. EH&S and the divisions improved their ability to identify employees with high risk factors before an injury occurs through the introduction of a Web-based employee ergonomic self-assessment and training program, augmenting the staff of certified ergonomists, implementing the ergonomic advocate program, and enhancing communications and awareness of safety to encourage employees to report injuries earlier. In the near term, however, because of these initiatives, more employees are coming forward with ergonomic injuries, which has led to increases in the TRC rate and Days Away, Restricted or Transferred (DART) case rate. Both DART and TRC rates did improve during the last two quarters, as compared to the first half of the year.



Institutional Opportunities for Improvement

- The Laboratory's EH&S Training Program needs improvement in some areas.
- SAA compliance needs improvement.
- Minor updates to radiological work documents may lead to unclear roles and responsibilities for divisions. (Noted during Engineering Division MESH.)
- Divisions need clarification on acceptable use of workplace First Aid kits.

Refer to Appendix B, FY07 Self-Assessment Opportunities for Institutional Improvement, for a complete list, associated recommendations, and status.

ISM Core Function 5: Feedback and Improvement

LBNL continues to strengthen ES&H communications. In addition to Laboratory-wide messages from the Laboratory Director, Chief Operating Officer and the EH&S Division, divisions have established extensive communications networks in the form of division-wide meetings and e-mail distribution, senior leadership ES&H forums, safety committees and subcommittees, newsletters, Webpages, etc. Notable in a few divisions is the Division Directors' and/or Deputy Division Directors' participation in the division safety committee. Several divisions conduct periodic ES&H surveys to gauge awareness of institutional and division policies.

Divisions investigated adverse ES&H conditions reported in the DOE Occurrence Reporting and Processing System (ORPS), Non-compliance Tracking System Reports, and Supervisor's Accident Analysis Reports (SAARs). Corrective actions taken to address some of these events resulted in the following institutional improvements:

- Penetration Permit process improvements.
- Fall Protection Program physical and administrative improvements.
- Enhanced emergency response preparations at the Potter Street facility.
- Enhanced basic electrical awareness training for Engineering Division employees. Elements of this new training will be incorporated into the Laboratory-wide basic electrical awareness training.
- New Lock Out/Tag Out (LOTO) procedures software. The new software unifies the appearance of LOTO procedures, promotes the use of photographs, and facilitates documentation of multiple source LOTO procedures.

Most divisions are effectively tracking and resolving safety deficiencies. As described in Section III ES&H Improvements, divisions worked diligently to resolve a backlog of overdue CATS entries during FY07. The MESH reviews did identify room for improvement in this area for some divisions. The FY07 Division Self-Assessments were more effective in addressing opportunities for improvement identified in FY06 than in prior years.

Institutional Opportunities for Improvement:

- Notification of the responsible division is inconsistent when an injured employee is referred to the UCB campus medical services for treatment.
- The CATS system has become less user-friendly due to redevelopment to accommodate new functions.

Refer to Appendix B, FY07 Self-Assessment Opportunities for Institutional Improvement, for a complete list, associated recommendations, and status.

V. ESH Technical Assurance Program

The ESH Technical Assurance program provides the framework for systematic reviews of ES&H programs and processes. The intent of ESH Technical Assurance assessments is to provide assurance that ES&H programs and processes comply with their guiding regulations, are effective, and are properly implemented by Laboratory divisions.

The Office of Contract Assurance (OCA) works with EH&S Division representatives to establish and maintain a three-year ESH Technical Assurance assessment schedule. EH&S assesses programs and processes based on institutional priorities, the risk-based gap analysis of assurance systems maintained by OCA, and an effectiveness review of the previous year's assessments. Review periodicity varies, depending on programs' and processes' hazards and risk.

ESH Technical Assurance assessments include regular inspections of the workplace, work activities, and facilities. Assessments also include reviews of documentation such as formal work authorizations, hazardous work permits, and EH&S and CATS databases. The primary elements of ESH Technical Assurance assessments are:

- Formal authorization compliance
- Regulatory compliance
- Program or process effectiveness
- Issues documentation (via the CATS database) and timely resolution
- Corrective action effectiveness (implemented via data monitoring and analysis)
- Lessons learned effectiveness.

Systematic assessments of the technical programs and processes provide the divisions and EH&S a basis on which to direct resources for improved ES&H performance.

Performance Results

ES&H implemented ESH Technical Assurance for a limited number of programs and processes in FY07. Program leads developed Technical Assurance Assessment Plans (TAAPs), conducted pilot assessments, updated TAAPs based on experience from the pilot, and conducted further assessments in the third and fourth quarters. For each program assessed, this report includes a brief program description, notable achievements and improvements, and programmatic opportunities for improvement. Deficiencies in division implementation of programs are communicated at time of assessments and tracked through resolution by the divisions.

Chemical Hygiene and Safety Program

The purpose of the Chemical Hygiene and Safety Program (CHSP) is to establish policies and procedures for the safe handling, use, and storage of hazardous materials in laboratory, shop, and office settings. The CHSP also describes roles and responsibilities and control measures (such as engineering, PPE, medical, administrative, and work practices) personnel can take to protect themselves.

The CHSP Manager submitted three quarterly reports covering implementation within the Chemical Sciences, Environmental Energy Technologies, and Genomics Divisions. The quarterly reviews included twelve field assessments, training and CATS records, and lessons learned dissemination.

The field assessments indicate that, in general, divisions and staff are properly implementing the CHSP. Isolated exceptions were communicated to the divisions for tracking and resolution.

Notable Accomplishments and Improvements

- A direct link to the Nalgene wash bottle chemical resistance database was added.
- EHS 348 (Chemical Hygiene and Safety Training) and EHS 352 (Chemical Hygiene for Students) were updated to address lessons learned from the failure of a low-density polyethylene wash bottle. EHS 348 was further updated based on preliminary results of the Molecular Foundry mercury spill investigation.
- A Web-based chemical skin absorber site was added to the glove section of the CHSP. This reinforces the importance of wearing gloves, especially for skin-absorbing compounds. Also, glove selection databases were arranged according to manufacturer and generic sites.
- Updated control procedures for flammable and combustible liquids. Clarified requirements for storage containers, gravity dispensing of flammable liquids, venting storage lockers and spill cleanup.
- Clarified the requirements for refrigerator posting and food consumption in the Work Practice Controls section of the CHSP.

Opportunities for Improvement

- The quarterly assessments of training completion suggest that, in some cases, staff members incorrectly complete their JHQ, thereby prompting CHSP training as a required course. Enhanced communication with divisions on proper JHA/JHQ completion is needed.

Controlled Substance Protocol

Schedule I and II chemicals listed in the Controlled Substance Act are used in research at LBNL and are subject to internal controls. The LBNL Controlled Substances Protocol provides guidelines for acquiring and accounting for controlled substances for scientific use at the Laboratory.

There were two controlled substance procurements during the reporting period. A review team comprised of the Controlled Substances Liaison Officer (CSLO) from Procurement, and representatives from Receiving, Security and Emergency Operations, and UC Police Department (UCPD) reviewed both transactions for adherence to the protocol.

Notable Accomplishments and Improvements

LBNL implemented the following improvements to the process based on these reviews:

- Require Principal Investigators (PIs) to identify a "Designated Alternative Signer" to receive substances in their absence to ensure timely and safe delivery of shipments.
- Prepared a procedure for transporting substances from LBNL Receiving to UCB and engaged UCPD for delivery off-site to UCB.
- Receiving or Security provides PIs with an updated Controlled Substances Protocol upon receipt of controlled substances, and Property Management provides PIs with the updated protocol during the annual inventory.
- Revised the Chain of Custody form to include additional details regarding shipments.
- CSLO initiates process of obtaining licensure in January to avoid lapse.
- Require suppliers to provide estimated time of arrival of substance.

Cranes, Hoisting and Rigging

The purpose of the Cranes, Hoisting, and Rigging Program at Berkeley Lab is to assure that all hoisting and rigging is performed safely and in conformance with all applicable standards, as well as to minimize the risk of damage to equipment and property. LBNL has more than 100 cranes and hoists. Each crane or hoist is required to be under the control of a crane manager, who is responsible for restricting the use of the unit, for authorizing personnel and for ensuring that the daily operator inspections are performed. Only qualified and authorized operators may operate cranes and hoists.

The Occupational Safety Group (OSG) conducted two technical assessments of the Cranes, Hoisting and Rigging Program. The EH&S Crane, Hoisting and Rigging Safety Subject Matter Expert (SME), Facilities Division Crane and Elevator representative and his supervisor, Crane and Rigging Service Contractor Representative, EH&S

Construction Safety Specialist and DOE Berkeley Site Office observer participated in one or both reviews.

The cranes inspected were in good operating condition, with Facilities' inspection tags current. The slings and other rigging in the area were also in good condition and current on their inspection tags.

The Facilities Division Crane and Elevator Office administers a subcontract for preventative maintenance and inspection of all cranes and hoists. A sampling of records maintained by the service contractor were reviewed and found to be complete and detailed. However, the service contractor is not responsible for, and does not have access to the Facilities database. In future reviews, the service contractor's records for cranes selected for review will be cross-checked with the Facilities database.

Notable Accomplishments and Improvements

- The crane operator training was revised, and there are now two new courses with new course materials, EHS210 *Crane and Hoist Operator 2 Tons and Under*, and EHS206 *Crane and Hoist Operator Greater than 2 Tons*.

Opportunities for Improvement

- The list of crane managers may contain inaccuracies. The SME will work with divisions over the next year to identify the appropriate individuals to accept the responsibilities as "crane manager" for each operating crane.
- Some cranes that are no longer in use and/or without an appropriately designated crane manager are accessible for operation. Cranes determined to be non-operating will be locked out by the service contractor until a crane manager who accepts the requisite responsibilities is named, and all necessary load testing and inspections have been completed.

External Dosimetry

The Radiation Protection Group (RPG) provides personnel external dosimetry in support of LBNL's compliance with 10CFR835 *Occupational Radiation Protection*. These services include dosimeter preparation, distribution, collection and processing, personnel dose calculation, and record maintenance. RPG maintains DOE Laboratory Accreditation Program (DOELAP) accreditation for external dosimetry. DOELAP accreditation is mandated by 10CFR835 for all DOE dosimetry programs that include personnel that are expected to receive greater than 100 mR dose per year.

The ESH Technical Assurance process for external dosimetry covers the DOELAP checklist contained in DOE STD-1112, current version. To align with the biennial DOELAP assessment, the entire checklist is covered in six quarterly installments, which allows a six-month period between the last review and the DOELAP assessment. During the performance period, the Dosimetry Program of RPG performed two of the six quarterly assessments. The assessments noted one finding in the calibration category, and an outstanding item from the March 2007 DOELAP review is currently being

addressed by the Dosimetry Program. There were also five documentation control observations related to procedures and training records.

Notable Accomplishments and Improvements

- LBNL successfully renewed its biennial DOELAP accreditation for external dosimetry. The accreditation process is a comprehensive quality assurance and technical review of the entire dosimetry program designed to ensure that the Lab meets the exacting requirements specified in 10CFR835.

Opportunities for Improvement:

- Complete calibration algorithm document.
- Tracking and closing out observations from internal and external assessments.
- Document control procedures and training records.

Pre-Placement Medical Evaluations Process

The Occupational Medical Director audited compliance with the Health Services exposure evaluation process required under the Regulations and Procedures Manual by comparing the 2006 number of new employee physicals to the number of new hires in 2006. He determined that the Lab had a less than 1% compliance rate.

Follow-up actions included consultation with the EH&S Training manager and EH&S's IT support to determine whether the Training Database, with its reminder functions, can be used to remind new employees of the need for a pre-placement evaluation. The Human Resources new employee process is a possible adjunct to using the JHQ training database to prompt new employees to come to Health Services for a pre-placement evaluation.

The Occupational Medical Director also reviewed the "Employee Report of Potential Exposures" form to ensure that it includes questions about appropriate exposures. This matter is concurrently under examination by the UC Occupational Medical Directors group and counsel at UC's Office of the President, who are reviewing the permissible evaluations under current California law.

Opportunities for Improvement

- Implement a process, such as the training database linkage, to remind new employees of the need for a pre-placement evaluation.
- Revise the medical history form in compliance with updated California requirements.

Radiological Work Area Posting

10CFR835 *Occupational Radiation Protection* defines radioactive material areas, radiological areas, and controlled areas and prescribes the posting requirements for each such area. Laboratory posting policy is promulgated in the Radiation Protection Plan

(RPP). Specific posting requirements are detailed in each Radiological Work Authorization (RWA) and authorized work and storage locations are listed by building and room designation. Compliant and consistent posting is essential to ensure effective hazard communication to all LBNL employees and visitors.

RPG inspected 138 spaces covered by 26 RWAs as part of the ESH Technical Assurance pilot program. While most locations were in full compliance, the health physicist did identify some minor deficiencies.

Notable Accomplishments and Improvements

- In response to the assessment findings, RPG updated its compliance checklist and provided refresher training for RPG staff in completing compliance inspections.

Satellite Accumulation Area Compliance

Satellite Accumulation Areas (SAAs) are regulatory defined areas in research laboratories or operational areas to temporarily accumulate hazardous wastes prior to transfer off-site for appropriate treatment, storage, and disposal or transfer to a permitted hazardous waste handling facility. SAAs store chemical wastes regulated by the State of California and possess chemical hazards. Hazardous waste accumulation must also conform to LBNL policies as outlined in PUB-3000, *Health and Safety Manual*, and PUB-3092, *Guidelines for Generators to Meet HWHF Acceptance Requirements for Hazardous, Radioactive, and Mixed Wastes at Berkeley Lab*.

Waste Management Group (WMG) staff periodically inspect SAAs and provide guidance to appropriate division personnel. If there are any noncompliant activities, division personnel correct them at the time of the inspection. During the performance period, the WMG inspected 89 SAAs in 11 divisions under the ESH Technical Assurance program and found only 26% in full compliance with Laboratory policy. The most prevalent issues identified during SAA inspections concern proper signs and labels. The WMG emphasizes correct signs and labels during hazardous waste generator training. All five Nonconformance and Corrective Action Reports (NCAR) issued by the Waste Management Group during the fiscal year were for waste stored in SAAs over the Laboratory's allowable time limit.

In September 2007, the City of Berkeley inspected SAAs in randomly chosen buildings and identified no violations during these inspections.

Notable Accomplishments and Improvements

- As a whole, the Laboratory continues to make use of the available resources, such as the "1 Minute 4 Safety" slides on SAAs. During FY07, the slide "Most Common Mistakes in Managing SAAs" received more than 1,200 hits.

Opportunity for Improvement

- SAA compliance needs improvement in some areas.

Wastewater Discharge Program

At LBNL, wastewater discharge is regulated by the East Bay Municipal Utility District at its facilities in Berkeley and Oakland and by the Central Contra Costa Sanitary District at the Joint Genome Institute in Walnut Creek. Both agencies use permitting processes, periodic monitoring, and enforcement inspections to administer their regulations. Non-compliance with wastewater discharge regulations can result in a Notice of Violation. In order to remain in compliance with the regulations, the Wastewater Discharge Program performs periodic sampling, validates analytical results, evaluates and trends results, and prepares documents in accordance with permitting requirements.

The Environmental Services Group wastewater discharge Program Manager (PM) conducted two quarterly assessments during the reporting period. The first assessment was of the sample collection program. The PM reviewed weekly technician reports, chains of custody, and the data management system and related procedures. The PM also observed sampling events of Groundwater Treatment Stations (GWTS) at B25A, B7, B6, B46, B51 Firetrail, B51L, and B51 Motor Generator room.

The second assessment was of the sample analysis performed by contract labs. The PM reviewed laboratory reports and correspondence, non-conformance reports, audit reports, the data management system, and related procedures. The review identified open findings from contract lab audits conducted by the DOE Consolidated Audit Program (DOECAP). The DOECAP is a program of annual qualification audits of environmental analytical laboratories and commercial waste treatment, storage, and disposal facilities. The PM tracks the status of open findings from contract lab audits and determines if those findings have operational impact on LBNL activities. In this case, the open findings do not impact the Laboratory's wastewater discharge program.

<u>Opportunities for Improvement:</u>

- Although maintenance activities for the GWTSs appeared to be adequately documented, the method the Laboratory uses to record the information can be improved for easier system-by-system review.
- Inspection logs for some fixed-treatment units need improvement. A field for the time of inspection needs to be added to the logs and recorded by the unit operators.
- Some fixed-treatment unit operators are not inspecting leak-detection probes according to procedure. The wastewater discharge PM recommends monthly inspection of leak-detection probes, documented in the same log as routine operator inspections of the fixed-treatment units.

VI. UC/DOE Contract 31 Performance Evaluation and Measurement Plan Self-Assessment

The prime contract between DOE and the University of California (Contract 31, Clause I.86 and Appendix B) includes a Performance Evaluation and Measurement Plan (PEMP) that establishes annual performance goals, objectives, measures, and targets for environment, safety, and health. As part of the contract, Laboratory and UCOP functional managers conduct self-assessments to evaluate performance against the PEMP. Although specific measures may change during the annual updating, the PEMP performance measures are always within the framework of the DOE Office of Science-mandated objectives. The Appendix B self-assessment is the LBNL's primary mechanism for evaluating its contract performance for ES&H.

The EH&S Division collects data and information quarterly, starting at the beginning of the fiscal year, to provide evidence of performance against the PEMP. This information is presented at joint quarterly meetings of LBNL, UCOP, and DOE staff. When applicable, they identify risks and recommend improvements to the ES&H program.

The FY07 UCOP/LBNL Self-Appraisal summarizes the cumulative ES&H performance for the year. This report is the formal submission to DOE to meet the assessment requirements of the DOE/UC contract. At the end of the fiscal year, DOE independently evaluates the program and makes recommendations for improvement.

Performance Results

In FY07, LBNL achieved a numerical score of 3.4, an equivalent B+ score in Goal 5.0, *Sustain Excellence and Enhance Effectiveness of Integrated Safety, Health and Environmental Protection*. The following noteworthy practices and opportunities for improvement were identified through this self-assessment.

Noteworthy achievements include:

- On July 31, 2007, the Department of Toxic Substances Control (DTSC) approved the Laboratory's Hazardous Waste Handling Facility (HWHF) Part B permit ten-year renewal. The process took four years and required public hearings and approval. A local citizens' group challenged DTSC's decision to issue the permit, which delayed implementation by six months. The renewed permit allows the maximum flexibility to handle wastes generated in the research and operations of LBNL. Granting of this permit is a reflection on the credibility that LBNL has worked hard to build with this agency.
- LBNL funded a number of EHS-related projects with Non-Cap Alteration and General Plant and Equipment funding, which allowed LBNL to make progress in

disposing of legacy material and remediating the National Tritium Labeling Facility. Another significant project for LBNL was to perform the radiological characterization of the Building 71 and the HILAC tank to support expansion of research activities and seismic upgrade construction.

- LBNL has improved occupational safety and health compliance efforts in FY07 through the implementation of a 10 CFR 851 Worker Safety and Health Program. In addition to the development and approval of the Worker Safety and Health Plan (PUB-3851), LBNL revised 16 of 28 chapters of PUB-3000 to incorporate the appropriate requirements.
- In March 2007, the Laboratory won the prestigious 2007 Ergo Cup with the innovative "Shake 'N Plate" instrument, a device designed to alleviate the upper-body fatigue associated with bacterial culture plating. In addition, in August 2007, the Laboratory completed 24 months of construction work, comprising more than 335,000 work hours, with only one recordable injury. This is a significant achievement, far better than the national average. While the national construction industry's safety record has improved over the past decade, the average Total Recordable Case Rate (TRC) for all U.S. construction work for 2005 was 6.1, according to the Bureau of Labor Statistics. Berkeley Lab's TRC for construction work for the previous 24 months was 0.6.

Opportunities for Improvement:

- From June 2006 to June 2007, LBNL generated seven electrical Occurrence Reporting and Processing System (ORPS) reports. While these incidents occurred in different divisions, the majority shared a common general cause: "Work Planning Needs Improvement/Less than Adequate." The analysis indicated that there was evidence of a recurring event. LBNL submitted an ORPS Recurrence Notification, initiated a causal analysis, and will develop and implement corrective actions and lessons learned to prevent recurrence.
- LBNL recognizes that a considerable portion of our research electrical apparatus and some electrical distribution systems have not been approved by one of the Nationally Recognized Testing Laboratories (NRTL), as required by NFPA70E. LBNL will develop a process for identifying, testing, and accepting electrical equipment.
- LBNL leadership will continue its commitment and effort to improve and sustain excellent safety performance in FY08 by aggressively ensuring that the programs formulated in FY07 are effective in reducing injuries, as well as implementing new programs to achieve and maintain "best-in-class" ES&H program performance in both TRC and DART.
- An investigation of the mercury spill at the Molecular Foundry in August 2007 identified opportunities for improvement of ISM at the institutional, facility and activity levels that are being addressed by the ISMS CAP corrective actions and more specific facility-level actions.

Appendix A
FY07 Self-Assessment Divisional Noteworthy Practices

Division	Noteworthy Practices
Accelerator and Fusion Research	• The development and use of Line Management Authorizations for all work that does not require a formal authorization. Absent a formal Job Hazards Analysis (JHA) process, the Line Management Authorization helps to identify potential hazards and controls at a lower level prior to starting work and when conditions change, and holds line managers accountable for the safety of employees and guests working for the division. Thirteen Line Management Authorizations were prepared, to identify hazards, controls, and responsibilities for work below the level requiring formal authorizations. • A three-tiered safety walkthrough system was implemented, including quarterly walkthroughs by safety staff, ongoing Supervisor Safety Plan walkthroughs by management and supervisors, and annual Quality Assurance/Improvement and Environment, Safety, and Health through Self-Assessment and Teamwork (QUEST) assessments involving all levels of personnel. • Seismic Safety Plans were developed and implemented to reduce personnel time in seismically "Very Poor" buildings. Approximately 50 people were moved out of Bldg. 71. More than 100 people have received seismic safety training. • Personnel worked safely with no recordable accidents for AFRD employees or guests from 2001-2007. • The CATS completion rate has improved, and the backlog of open CATS has been reduced. Pollution prevention, energy conservation, recycling, and waste minimization efforts include: • Continued program of using launderable rags wherever feasible to reduce the quantity of oily rags. • Usable items discovered during chemical cleanouts were donated to projects; examples, two containers of chemicals left over from the SNS project were given to the 71B shop for use, and a sodium iodide detector and some metal foils left over from the Heavy Ion Accelerator (HILAC) era were given to 88-Inch Cyclotron personnel for reuse.

Division	Noteworthy Practices
Advanced Light Source	• ALS is working with Facilities to develop in-house capabilities to install fall protection, and the ALS Facility Manager attended a certification course. With in-house capability, the Division can ensure more timely and efficient implementation of the required controls. • The Division takes snapshots of the JHQ profiles in late June and supervisors consider them in preparing PRDs. The response to the PRD question "Did the employee meet the Laboratory's institutional expectations in the area of EH&S, Diversity and Property?" cannot be affirmative if training is outstanding and both supervisor and employee must respond. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Reduction of chemical inventory as part of the move from B10. Of the 500-plus items taken out of inventory, Waste Management assisted in finding reuse options for more than 100. This was a cooperative effort with Facilities and Chemical Sciences. • Centralized management of and controlled access to the user chemistry lab results in formal review of all proposed work. Potential waste streams are identified as a part of this review. • Users must now find LBL staff to agree to act as custodians in order for chemicals to be maintained in LBL inventory. This has resulted in a reduction of the overall inventory. • ALS has improved the effectiveness of its efforts to return gas cylinders to the manufacturers rather than have them sent to waste or stored indefinitely. • A two-year effort with Facilities is planning for the replacement of the lighting fixtures in the experimental hall. Driven by fire safety concerns, ALS looking hard at energy reduction alternatives and has just finished a feasibility study by a contractor (YEI Engineers) for magnetic induction lights. The replacement scheduled to be performed during the May 2008 shutdown.

Division	Noteworthy Practices
Chemical Sciences	• CSD initiated a thorough analysis of the fire-alarm system in Building 2 following the report from a building occupant that the alarms were inaudible in two laser laboratories. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Large-scale reuse and recycling of chemicals and glassware following the departure of a veteran employee and closure of his lab. • Replacement of argon or krypton ion lasers with diode-pumped and doubled vanadate lasers saves many thousands of watts per hour per laser, and performance is much improved.
Computing Sciences	• Staff collaborated with EH&S Training staff for implementation of ES&H for Managers, Supervisors, PIs and Mentors of Students (EHS0026). This training has proven to be invaluable for line managers and supervisors who are ultimately responsible for their staff's safety. • NERSC Division installed the Franklin Supercomputer system, requiring significant electrical upgrade work. All phases of construction requiring significant computer room and infrastructure modifications, electrical shutdowns, expansion, and energization were accomplished safely and without incident. • During the past year, with a staff approximating 435 employees, Division received zero OSHA recordable injuries.
Directorate/ Operations	• The office of the CFO Field Operations Manager mounted efforts to address safety for the Field Operations unit's 50-plus matrixed staff. • Division Safety Coordinator's (DSC) participated in the Ergo Advocate program and completed 150 ergonomic evaluations during the past year. • DSC established a modified ergonomic display room in B937 to allow employees more convenient and timely access to standard ergonomic equipment.

Division	Noteworthy Practices
	• The risk of injury to employees who arrange conference room furniture was reduced by the purchase of tables with casters. • The Operations Business Manager was appointed as Safety Manager. The combined efforts of the Safety Manager and DSC provide a more effective means of responding to safety assessment findings and assuring the Director and the staff on the status of safety within the division. • Memorandum of Understanding was put in place for mentors and students in Center for Science and Engineering Education programs.
Earth Sciences	• The DSC submits a quarterly ES&H report to Division Council. The DD participates in the Division Safety Committee meetings on a quarterly or more frequent basis. • The Ecology Department Head regularly performs safety walkarounds, each time asking a different staff member to accompany him. In FY07, walkthroughs were performed on July 19, 2006, November 3, 2006, May 30, 2007 and September 6, 2007. Findings are distributed via e-mail, and "validation of completion walkthroughs" are performed afterwards. • The hazard-analysis table of the Off-Site Safety and Environmental Protection Plan (OSSEPP) was updated to include ergonomic hazards. • ESD has a six-month limit on waste storage in an SAA to ensure that no waste exceeds the laboratory's time limit. • No first-aid ergonomic injuries in FY07 progressed to recordable injuries. No other first-aid incidents have recurred. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • A new benchtop neutralization procedure was approved by Waste Management for ESD researchers, minimizing waste generated. • Mercury manometers and barometers were identified and disposed of as universal waste.

Division	Noteworthy Practices
Engineering	• Engineering has committed resources for two safety coordinators. Depth in this critical function enhances their ability to perform root-cause investigations on injuries and adverse ES&H events, and develop and implement new safety initiatives. The division is also able to perform long-term succession planning to the veteran safety coordinator. • Developed an online ISM training course, required for all employees. Designed and produced associated ISM badges for employees to carry and serve as a constant reference and reminder of ISM. The badge also includes the name and extension of one of the division's safety coordinators. • Communicated Basic Safety Expectations to all its employees. • The division posts overdue JHQ and training completion reports in the directorate lobby, and when training completion is overdue, supervisors and employees must meet with the Division Director to explain the circumstances. • Based on our interviews, new employees take the JHQ along with their supervisor. Of necessity, the JHQ is somewhat confusing for new employees, and taking it with their supervisor ensures that new employees will take the classes they actually need and do not take unnecessary classes. • Division assumes responsibility for ORPS reporting of adverse events involving Engineering staff while working under the direction of partner divisions. The intent is to encourage Engineering employees to report such events, with minimal concern for burdening the customer with ORPS reporting and subsequent investigation. • Engineering Division has trained three employees in formal root-cause analysis. Both division safety coordinators have comprehensive root-cause analysis training, enabling them to guide Engineering and its customers in developing effective, sustainable improvements to prevent recurrence. • Following an ORPS-reportable electrical near-miss incident, Engineering identified the cause of the event as insufficient knowledge of the mechanical technician to analyze and mitigate the electrical hazards. In response, Engineering worked with EH&S to develop ENG1001 *Electrical Safety—What Everyone Needs to Know*. The objective of this brief Web-based training is to ensure a common baseline understanding for all Engineering employees and achieve zero incidents in the future. The LBNL Electrical Safety Officer plans to incorporate

Division	Noteworthy Practices
	elements of this new Engineering training into the Laboratory-wide course EHS 260, Basic Electrical Hazards and Mitigations. • A separate ORPS-reportable electrical safety event involving an Engineering employee prompted the division to seek improved methods for documenting multiple source Lock Out/Tag Out (LOTO) procedures. Engineering researched new LOTO software and hosted a product demonstration by the vendor for potential users including the LBNL Electrical Safety Officer, the SRC Electrical Safety Subcommittee chair, and key individuals from partner divisions ALS and NSD. Following positive responses from attendees, Engineering purchased the local version, and EH&S ultimately purchased a version for Lab-wide use. The new software unifies the appearance of LOTO procedures, promotes the use of photographs, and facilitates documentation of multiple-source LOTO procedures. • Division Director personally teaches EH&S 027, Walkaround Inspection (tailored to meet safety challenges of Engineering work space and activities). • Line management commitment to safety. Engineering requires that the cognizant deputy and the immediate supervisor or his/her supervisor participate in the SAAR process, project safety reviews, workspace safety reviews, job safety analysis, updating the chemical inventory and initiating and managing formal work authorizations. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Major participant in the Laboratory's washable shop rags program. • UHVCPF continues to employ acid scrubbers as part of the pollution prevention process. • Engineering suite of offices set up with energy-saving power strips (Watt Stoppers) that shut down nonessentials when the room is not occupied. • Computers are set to go into hibernation mode after one hour.

Division	Noteworthy Practices
EETD	• EETD has a pro-active, division-specific ergonomic safety policy and plan that was first developed in 1999. The plan has since received regular review and update. • EETD has developed a divisional ES&H program implementation plan for FY08 that includes the key activities of its ES&H self-assessment. • The Division has identified several key metrics that are tracked internally and compared against performance over the last ten years. • EETD provides a quarterly division safety report to senior division management. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Mandated the purchase of recycled paper for copiers/printers on a division-wide basis. Also sent out a division-wide "What's New?" article on June 20, 2007 on how to save energy, linked to a list of a dozen energy-conservation suggestions. The list is still on EETD's Intranet. • In May 2007, a new 90-0096 Excess Room was put into operation and widely publicized for all Building 90 and 90-Trailer occupants. This new program is modeled after the Buillding 70 loading-dock collection area that EETD spearheaded a few years ago, and allows building occupants to recycle and dispose of property at no cost to them and with minimal effort. Instructions and all necessary forms (Equipment Movement Tags, Universal Waste Labels, etc.) are provided in the Excess Room. Transportation and Waste Management make regular pickups.
EH&S	• Team approach to performing the self-assessment. • Interviews with group leaders, supervisors, and general employees facilitate the regular flow of communication up and down the chain of command within groups. Supervisors and employees regularly meet one on one, and employees talk openly on a variety of matters with their supervisors. • The Division Director recognized that communication between group leaders and senior management was an area in need of improvement, and, as a result, now chairs the EHS Division Safety Committee to enhance safety communication.

Division	Noteworthy Practices
	Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • The Fire Department minimized hazardous waste generation by purchasing fire-extinguisher training equipment that removed the need to generate a water-gasoline-diesel mixture and also reduced solid debris waste. • EHSD established a Working Green Initiative as part of its commitment to environmental stewardship. This includes an emphasis on energy and resource conservation.
Facilities	• Celebrated two years of almost injury-free construction work. This included more than 335,000 work hours with only one recordable injury. This significant accomplishment is far better than the national average. • The supervision of contractors by Facilities' Design and Construction Group has improved, with greater emphasis being placed on pre-job hazard analysis and construction oversight. Financial incentives were incorporated into contracts to encourage contractors to provide "best in class" safety performance. • Ergonomic training and improvements have been targeted to specific groups, including the plant maintenance, custodial floor crew, mailroom employees and metal rack users. • Facilities Division requested an ergonomic assessment of the metal rack that was subsequently completed. • A class on heavy lifting was developed and given by the EH&S Ergonomic subject matter expert to all plant maintenance personnel. • Improved penetration permit process and instituted quarterly reviews that include feedback from permit users. • Division-specific new employee job safety orientation. • A Haunted Laboratory was hosted promoting safety, fun, and information for Facilities and the entire Laboratory.

Division	Noteworthy Practices
	Pollution prevention, energy conservation, recycling, and waste minimization efforts include: • Recycling oily rags. • Stocking only rechargeable batteries in stores. • All packing popcorn Lab-wide is recycled through the shipping department. • All tires and oil products from Motor Pool are recycled. • Over 3,000 lbs of shrink wrap and plastic bags are recycled annually. • Key Shop recycles hinges, knobs, handles, and keys. • Building demolition materials are recycled. • Biodiesel and ethanol fuels are used in some fleet vehicles. • Custodial Department uses green cleaners. • Dolphin series water treatment reduces chemical usage. • Installation of low-flow toilets, shower heads, and urinals in all buildings.

Division	Noteworthy Practices

Genomics	• Improved laboratory and work area hazard door sign format, modeled after the existing Materials Sciences Division and developed by the JGI Division Safety Coordinator. New signs include clear visual icons and combine hazard, contact, PPE, and precaution information for entering the area.
	• Improved chemical inventory management by designating a responsible individual for each laboratory and performing quarterly spot checks of inventory accuracy.
	• Received "Ergo Cup" award for "Most Outstanding Team-Driven Workplace Solution" at the Applied Ergonomics Conference.
	• JGI Safety Committee working groups: Ergonomics Working Group and Safety Culture Working Group.
	
	Pollution prevention, energy conservation, recycling, and waste-minimization efforts include:
	• Analysis and sewer discharge of the following waste streams:
	  • A one-time accumulation of approximately 220 gallons of rainwater from trash compactor covered basin.
	  • TempliPhi Waste Stream: Water and ethanol waste stream tested and determined to be non-hazardous. An estimated 48 liters per year of non-hazardous liquid waste will be sewer discharged.
	  • Array Reconditioning Waste Stream: Cleaning buffer (dilute Tris-HCL and EDTA), trace nitric acid, and water [pH=5.5] was tested and determined to be non-hazardous. An estimated 36 liters per year of non-hazardous liquid waste will be sewer-discharged.
	• Guest Safety Glass Reuse Program: Disposable safety glasses are reused instead of being thrown away. Glasses are rinsed in a dishwasher to sanitize them prior to reuse. Approximately 120 pairs of safety glasses are reused every month, resulting in a monthly savings of $200.

IT	• IT has implemented an aggressive ergonomics safety program. This includes:
	  • Purchasing voice-recognition software.
	  • Adopting requirements for, at a minimum, workstation evaluations every two years.
	  • Piloting Remedy Online Ergonomic System and a Workers Helping Workers program.
	  • Training 90% of IT supervisors in EHS022 "Ergonomics for Supervisors."
	  • Evaluating 95% of division staff.

Division	Noteworthy Practices
Life Sciences	• LSD increased awareness of ergonomic issues and allocated almost $90K for ergonomic equipment in FY07. The MESH team heard positive feedback from employees on recently procured electric pipetters. The division is in the early stages of addressing ergonomics at microscope user stations. They are also investigating high-throughput robotics to reduce repetitive stress injuries. • Following its LSDSC meetings, the division summarizes current ES&H issues and formats the information into a Life Sciences Division Safety Bulletin. Bulletins are posted in common areas for LSD staff to read. • The division has committed resources for a Deputy Division Safety Coordinator position to assist with the implementation of ISM. This individual also serves as the LSD representative to the Safety Review Committee. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Measures taken in the high throughput Characterization Facility to ensure that only enough material is produced and used for effective and accurate analysis. Reduced volume samples are also easier to store for subsequent work, and prevent the creation of excess materials that would have to be disposed of as hazardous waste. • Robotic sample analysis performed on micro-scale basis, reducing the amounts of hazardous chemicals (primarily solvents; the other materials involved are primarily non-hazardous buffers and salts) generated as hazardous waste.
Materials Sciences	• Implementation of the Project Hazard guide questionnaire. PIs systematically identify hazards and controls for work performed in their labs. The division EH&S manager uses the information in setting priorities and conducting inspections. This process is a forerunner to the institutional Job Hazards Analysis process. • Pre-review of AHDs by DSC and ESH technician to provide advice and training to safety leads. • Weekly review of safety program elements by DSC and Deputy Director. • Instituted vendor review and permitting processes in response to several serious safety mishaps involving vendor work practices. • Instituted a hard-wired electrical component labeling program to notify vendors and LBNL personnel that equipment must be properly locked and tagged out prior to service and that certain work requires pre-approval by the MSD EH&S Manager.

Division	Noteworthy Practices
	• Beginning February 2007, MSD EH&S Manager now meets with new LBNL GSRAs, postdoctoral students and staff to review JHQ, discuss their planned work, establish the division's expectations for safety performance and open lines of communication. • Extensive feedback and improvement program, including the Materials Safety Bulletins, near-miss reporting incentive program and annual PI EH&S presentation at the division's off-site strategic planning meeting. Pollution prevention, energy conservation, recycling, and waste minimization efforts include: • Recycled hundreds of pounds of pure gallium-arsenide, resulting in disposal cost savings and a refund of $6,000 for material value.
Nuclear Science	• NSD management is actively involved with the EH&S program, meeting with the Safety Coordinator and EH&S Liaison on a weekly basis and participating in the NSD Safety Committee. • NSD effectively communicates EH&S issues within the division. In addition to an all-hands safety meeting, the division continues to have an EH&S topic discussed at the beginning of the Monday all-staff meetings. Additionally, e-mails are sent to staff as needed on EH&S topics. The Monday morning meetings, a bi-weekly meeting that all division staff members are invited to, is an outstanding ES&H communication mechanism. Safety discussion is conducted for ten minutes or so before a scientific presentation. This is a good way of engaging scientific staff and ensuring robust staff representation. Staff appears to appreciate the safety discussion that takes place in these meetings and, in interviews, cited several safety topics that they found valuable. • NSD strives to support a culture that encourages reporting accidents, potential problems and ergonomic discomfort. Employees feel they have a responsibility to report conditions that could be a potential problem. For example, during the MESH review, one of the NSD staff reported that she feels the fire extinguisher training provided by the Lab is not adequate for the extinguisher in her area. • The safety program at the 88-Inch Cyclotron includes extra elements that are not required by the institutional EH&S program. For example, there are technical reviews for modifications or new work. In the last year, technical reviews were held for adding plutonium targets and for adding neutron generators.

Division	Noteworthy Practices
	• NSD has developed a strategy to prioritize ergonomic evaluations and has addressed ergonomics in non-office areas, which was formalized in an ergonomic program in PY2007. • The 88-Inch Cyclotron control room has several process instructions that are posted in key locations. Each of these instruction sheets is signed and dated, an excellent practice for ensuring that posted instructions remain current. • The Project/ Facility Safety Review Questionnaires are an effective tool for project leaders in identifying and controlling hazards. These forms are tailored to NSD needs, and the NSD safety program requires that they are completed annually and when there are changes to a project safety envelope. This ensures that all projects are reviewed annually in manner that is easy for Principal Investigators to apply. • The NSD Walk-Around Checklists provide research groups with an easy and effective basis for assessing safety hazards in their workspaces. The checklists are designed to review the most common hazards found in research laboratories. NSD has implemented a formal requirement that these forms be completed quarterly by each PI. PIs understand the value of this exercise and are responsive in completing forms. • Senior management involvement in the division safety program is noteworthy. Including safety in every agenda of the Director's Monday morning meetings sends a strong message. Additionally, the Division Deputy sits on the Division Safety Committee and meets with the Division Safety Coordinator and EH&S Division Liaison weekly. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Reduced energy consumption at the 88-Inch Cyclotron by replacing 10 of the original quadrupole power supplies, which are only 17% efficient, with new switches that are 85% efficient. The upgrade reduces the maximum power needed for the beam line quadrupoles from 39 kWatt to 7 kWatt. • Continued the use of recyclable shop rags at the machine shop in B88. • Cleaned out a lab in B71 that contained legacy chemicals, eliminating the possibility of future spills.

Division	Noteworthy Practices
Physical Biosciences	• PBD's process for routine work authorization includes interviews with supervisors/ work leads and completing a personal safety checklist. • PBD staff members are required to complete Emergency Response Training specific to their buildings. • The division identifies performance metrics that are reviewed in weekly meetings of the Safety Planning Team. • PBD proactively manages chemicals. It is performing a wall-to-wall inventory of a selected research group to assess the overall accuracy of its chemical inventory. In addition, it plans to conduct spot peroxide tests on decanted liquids and isopropanol to better assess the overall peroxide risk level of its chemicals. • PBD staff members are annually required to complete an individual ES&H self-assessment. This process increases safety awareness among staff and alerts the Safety Planning Team to potential safety hazards in division workspaces and activities. • All PBD hazardous waste is requisitioned for pickup semiannually, ensuring that waste remains compliant with institutional storage time requirements. • Work leads are listed by name in the Division ISM Plan. During FY08, respective work leads will be identified on door signs for PBD workspaces. Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Systematic and successful efforts to reduce waste generated from the closeout of Calvin Laboratory; reuse of administrative and laboratory supplies; furniture reuse in new division work areas or processed through the Property Reuse Center; sinks reclaimed by the UCB plumbing shop; and metal transported to B70 for recycling.
Physics	• Physics Division management is actively involved with the EH&S program, meeting with the Safety Coordinator and EH&S Liaison on a weekly basis and participating in the Physics Division Safety Committee. • The Physics Division effectively communicates EH&S issues within the division. In addition to an all-hands safety meeting, the division continues to have an EH&S topic discussed at the beginning of the Monday all-

Division	Noteworthy Practices
	staff meetings. Additionally, e-mails are sent to staff as needed on EH&S topics. • The Physics EH&S program has developed a written definition of safety roles for line managers, which can be found on the division Website. • The Physics Division has established checklists, instructions and forms on the division Website to help the managers fulfill their safety responsibilities. Instructions are included for the common EH&S databases that managers are expected to be able to use (CATS, JHQ, HEAR, etc). • The division recently changed the roles and responsibilities of the Group Leaders and the ES&H Coordinator. Previously, the ES&H Coordinator was responsible for many of the safety obligations usually assigned to principal investigators. Greater responsibility now rests on line management and less so on the ES&H Coordinator. This is a positive change in that the safety responsibilities now rest with line management. • The project review process is commendable. The ES&H Coordinator and ES&H Committee review all Project/Facility Safety Review Questionnaires for new work and existing work with changes in scope. In response to the 2003 MESH review, the division reinstated the annual submission and review of the questionnaire, adding formality to the periodic review of work with no change in scope. All work within the division undergoes this annual review. The ES&H Coordinator and ES&H Committee also review formal EH&S work authorizations before they are finalized and often include the EH&S Division Liaison and other EH&S Division subject matter experts in the reviews. The committee consists of members who represent the breadth of Physics, which is vital for assessing ES&H issues from all parts of the division. • Performance of work within established controls has resulted in the Physics Division's excellent safety record of low injury/accident rates and no adverse ES&H events in the last 13 years. • The vertical slice review is an excellent tool to assess strengths and weakness in the division's safety program. The 2006 vertical slice did identify opportunities for improvement, and the division has corrective actions under way to address those areas in 2007.

Division	Noteworthy Practices
	Pollution prevention, energy conservation, recycling, and waste-minimization efforts include: • Continued use of recyclable cloth shop rags. • A proposal to polish TeO_2 crystals at LBNL was discussed with EH&S Waste Management to ensure that waste would be minimized.

Appendix B
FY07 Self-Assessment Institutional Opportunities for Improvement

Opportunity for Improvement	Recommendation/Status
Division ES&H Self-Assessment and MESH Reviews	
Current processes for notifying affected personnel of substantive revisions to PUB-3000 are inadequate.	Develop and implement notification process, such as a link to JHA/JHQ responses.
Existing policy[2] on roles and responsibilities for matrixed staff does not adequately address responsibilities and authorities for space and equipment use.	Revise policy to comprehensively address responsibilities and authorities for space and equipment use.
The selection, qualifications, training, and responsibilities of Shop Managers need to be more clearly defined, communicated, and implemented.	AFRD and EG identified this improvement opportunity and plan to work together in the coming year to update the policy.
Not all divisions have fully implemented an effective safety walkaround program.	Divisions identified improvement opportunities in this area. The FY08 Division ES&H Self-Assessment Performance Measures include a measure of the implementation and effectiveness of division walkaround programs and completion of ESH0027, "Performing an Effective Safety Walkaround."
Hazard identification and analysis, including that for off-site work, needs improvement in some areas.	Divisions implement planned improvements for FY08 and work with EH&S to perform Job Hazards Analyses for all division personnel.

[2] LBNL/PUB-3000 Health and Safety Manual, Chapter 1, Section 1.3.2.7 Matrixed Employees

Opportunity for Improvement	Recommendation/Status
Division ES&H Self-Assessment and MESH Reviews	
Use of the Laboratory's HMS to inventory hazards is not an institutional requirement.	Establish institutional policy requiring use of HMS.
The Chemical Management System has no method for a custodian to certify a non-changing inventory as accurate. Enhanced notification and reporting capabilities are also areas for improvement.	During FY08, EH&S will assess implementation and effectiveness of the Chemical Management System through ESH Technical Assurance.
Inadequate or outdated emergency evacuation signs are posted at some Laboratory locations.	LBNL will implement an improved process in second-quarter FY08.
Implementation of the Laboratory's Ergonomics Program needs improvement in some areas; equipment loaner program, database information, and ergonomic equipment procurements.	The following are issues identified by divisions and/or recommendations for improvement: • Revive and expand equipment loaner program. • Timeliness and reliability of database information. • Ergonomic equipment identification and procurement process. The Laboratory's new ergonomics database, launched in December 2007, will streamline ergonomic evaluations and improve communications with supervisors and managers. The improved database includes new features such as links to ergonomic product catalogs.

Opportunity for Improvement	Recommendation/Status
Division ES&H Self-Assessment and MESH Reviews	
The Lab's EH&S Training Program needs improvement in some areas.	The following are issues identified by divisions and/or recommendations for improvement: • The Laboratory's systems do not provide an easy and effective way for divisions to monitor which guests and visitors should be completing JHQs, in particular those for employees and guests who work at LBNL on an infrequent or sporadic basis. • Increase the number of online training classes, particularly EH&S 10 and 60. • Enhance capabilities of the HRIS/JHQ databases to send "stop work" notice to employees, supervisors, and division management when critical safety training has expired. Facilities currently pursuing this application with EH&S Training. • Ensure division-specific training courses are consistent with Lab policy and procedures.
SAA compliance needs improvement	EH&S and divisions need to develop and implement methods to improve SAA compliance.
Minor updates to radiological work documents may lead to unclear roles and responsibilities for divisions. (Noted during Engineering Division MESH.)	When a "pen-and-ink change" of an X-ray System Supervisor also prompts a change in responsible division on an X-ray authorization, RPG should reroute the authorization for review and approval. RPG took action on this matter following the Engineering MESH review.

Opportunity for Improvement	Recommendation/Status
Division ES&H Self-Assessment and MESH Reviews	
Divisions need clarification on acceptable use of workplace First Aid kits.	EH&S has drafted a policy on First Aid at LBNL that would allow First Aid kits. Furthermore, EH&S Health Services installed a prototype employee-identification-activated First Aid box for after-hours access to First Aid kits. When unlocked with an ID badge, employees take whichever of the two kits they want, and an e-mail goes to Health Services to a) contact the employee for follow-up, b) initiate whatever reporting is necessary, and c) restock the box. This box is the subject of a patent application submitted in December 2007 with five LBNL co-inventors on the application.
Notification of the responsible division is inconsistent when an injured employee is referred to the UCB campus medical services for treatment.	Review and revise internal procedures to ensure notification of the responsible division.
The CATS system has become less user-friendly due to redevelopment to accommodate new functions.	During FY08, OCA will implement CATS improvements to address concerns raised by users.

Opportunity for Improvement	Recommendation/Status
ESH Technical Assurance Self-Assessments	
The quarterly assessments of training completion suggest that, in some cases, staff incorrectly completes their JHQ, thereby prompting Chemical Hygiene and Safety Program training as a required course.	Enhanced communication with divisions on proper JHA/JHQ completion is needed.
The list of crane managers may contain inaccuracies. Some cranes that are no longer in use and/or without an appropriately designated crane manager are accessible for operation.	The SME will work with divisions over the next year to identify the appropriate individuals to accept the responsibilities as "crane manager" for each operating crane. Cranes determined to be non-operating will be locked out by the service contractor until a crane manager who accepts the requisite responsibilities is named, and all necessary load testing and inspections have been completed.
External dosimetry program: • Calibration algorithm document incomplete. • Tracking and closing out observations from internal and external assessments. • Document control – procedures and training records.	Complete calibration algorithm document. Develop and implement methods to improve tracking and closing out observations from internal and external assessments and document control.
SAA compliance needs improvement.	EH&S and divisions need to develop and implement methods to improve SAA compliance.
The method the Laboratory uses to record the groundwater treatment stations information can be improved for easier system-by-system review. Inspection logs for some fixed-treatment units need improvement. Some fixed-treatment unit operators are not inspecting leak detection probes according to procedure.	A field for the time of inspection needs be added to the logs and recorded by the unit operators. The wastewater discharge PM recommends monthly inspection of leak-detection probes, documented in the same log as routine operator inspections of the fixed-treatment units.

Opportunity for Improvement	Recommendation/Status
Contract 31 PEMP Self-Assessment	
From June 2006 to June 2007, LBNL generated seven electrical ORPS reports. While these incidents occurred in different divisions, the majority shared a common general cause: "Work Planning Needs Improvement/Less than Adequate."	The analysis indicated there was evidence of a recurring event. LBNL submitted an ORPS Recurrence Notification, initiated a causal analysis, and will develop and implement corrective actions and lessons learned to prevent recurrence.
LBNL recognizes that a considerable portion of our research electrical apparatus and some electrical distribution systems have not been approved by one of the Nationally Recognized Testing Laboratories (NRTL), as required by NFPA70E.	LBNL will develop a process for identifying, testing, and accepting electrical equipment.
Increasing illness and injury case rates.	LBNL leadership will continue its commitment and effort to improve and sustain excellent safety performance in FY08 by aggressively ensuring that the programs formulated in FY07 are effective in reducing injuries, and implement new programs to achieve and maintain "best-in-class" ES&H program performance in both TRC and DART.
An investigation of the mercury spill at the Molecular Foundry in August 2007 identified opportunities for improvement of ISM at the institutional, facility and activity levels.	Opportunities for improvement are being addressed by the ISMS CAP corrective actions and more specific facility level actions.

Appendix C
FY2007 ES&H Division Self-Assessment Performance Measures

ISM CORE FUNCTION 1: DEFINE WORK

E1. Revise Division ISM plan to reflect a) ES&H policy changes, and b) updates to the Institutional ISM plan. Line management communicates updates to the plan to division personnel.
Note: By mid-July 2007, OCA will provide divisions with a list of substantive PUB-3000 revisions divisions are expected to address in ISM plans (Attachment 1).

ISM CORE FUNCTION 2: IDENTIFY HAZARDS

E2. Workspaces (including outside workspaces) are inspected/observed and evaluated on a regular basis.

E3. Divisions review work activities to identify, analyze, and categorize hazards and environmental impacts for the associated work. Examples of hazard inventory include: HEAR database (or equivalent), project safety review, workspace safety review, Job Hazard or Safety Analyses (JHA/JSA), environmental review (NEPA/CEQA), and chemical inventory.

E4. Divisions review the environmental impact of their activities and participate in pollution prevention, energy conservation, recycling, and waste-minimization programs.

ISM CORE FUNCTION 3: CONTROL HAZARDS

E5. Divisions ensure administrative controls are in place and maintained. Examples of administrative controls include: formal authorizations, work procedures, project safety reviews, and responsibilities for matrixed employees.

E6. Divisions ensure that ergonomic hazards (computer, laboratory, and material handling) are adequately controlled and that employees and line management are knowledgeable and engaged in this process, including the early reporting of ergonomic pain or discomfort (before an injury):
Ergonomic issues/concerns/discomfort/pain are reported promptly for immediate corrective action.

ISM CORE FUNCTION 4: PERFORM WORK

E7. Work is performed within the ES&H conditions and requirements specified by Laboratory policies and procedures.

E8. Staff is properly trained.

E9. Division ensures that student safety issues are effectively addressed.

ISM CORE FUNCTION 5: FEEDBACK AND IMPROVEMENT

E10. ES&H deficiencies that cannot be resolved upon discovery are entered and tracked in CATS to resolution.

E11. Division employees report injuries and the division performs a thorough review of all staff injuries and accidents, including analysis of conditions that led to injury. Corrective actions to prevent recurrence are identified and effectively implemented.

Appendix D
List of Acronyms and Abbreviations

AFRD	Accelerator and Fusion Research Division
AHD	Activity Hazard Document
ALS	Advanced Light Source
CATS	Corrective Action Tracking System
CSD	Chemical Sciences Division
DART	Days Away from work and Restricted Time
DOE	Department of Energy (U.S.)
DSC	Division Safety Coordinator
EETD	Environmental Energy Technologies Division
EH&S	Environment, Health, and Safety Division (LBNL)
ESD	Earth Sciences Division
ES&H	Environment, Safety, and Health (DOE term)
HEAR	Hazards, Equipment, Authorizations, and Review System
HMS	Hazard Management System
IT	Information Technology Division
ISM	Integrated Safety Management
JHA	Job Hazards Analysis
JHQ	Job Hazards Questionnaire
LSD	Life Sciences Division
MESH	Management of ES&H
MSD	Materials Sciences Division
NCAR	Nonconformance and Corrective Action Report
NSD	Nuclear Science Division
OCA	Office of Contract Assurance
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
PBD	Physical Biosciences Division
PI	Principal Investigator
PPE	Personal Protective Equipment
RPP	Radiation Protection Plan
RPG	Radiation Protection Group
RWA	Radiological Work Authorization
RWP	Radiological Work Permit
SAA	Satellite Accumulation Area
SAAR	Supervisor Accident Analysis Report
SRC	Safety Review Committee
TRC	Total Reportable Cases
UCB	University of California at Berkeley
UCOP	University of California Office of the President